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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,718	08/31/2001	Kevin Ray Anderson	11936.12US01	1730

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EXAMINER

HUG, ERIC J

ART UNIT	PAPER NUMBER
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1731

DATE MAILED: 08/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/944,718

Applicant(s)

ANDERSON ET AL.

Examiner

Eric Hug

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-10 and 14-25 is/are rejected.
- 7) ☒ Claim(s) 6 and 11-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

1. Claims 1-3, 8-10, 14, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Billmers et al (US 4,839,449). Billmers discloses aldehyde-containing polysaccharides, including starches, which are derivatized by reacting with amine compounds. Suitable amine compounds are given in column 8, line 59 to column 9, line 11, and include water-soluble polymers containing one primary amine. Since an aldehyde-containing starch is a starch with carbonyl groups, this reads on claims 1-3. With respect to the other claims:

Claims 8, 9, 10, 14: The starch can be an oxidized starch treated by oxidants such as sodium hypochlorite (column 5, lines 41-43).

Claims 17, 18: The aldehyde-containing polysaccharides have no carboxyl groups, thus they have a carbonyl to carboxyl functionality ratio greater than 2.5 to 1.

2. Claims 1-4, 8, and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Espy (US 3,728,214). Espy discloses polyamine-acrylamide-polyaldehyde resins for use as strength agents in making paper. First, a polyamine containing primary and/or secondary amine groups is reacted with a polyacrylamide. The resulting polymer is then reacted with an aldehyde containing compound to form an adduct. The aldehyde compound can be dialdehyde starch (see column 2, lines 52-63), which has two carbonyl functionalities. The amine compound can be polyvinylamine (see column 2, lines 24-35). The resulting resin is added to the wet end of the papermaking process (fan pump or head box) at a dosage of 0.05% to 5% based on the dry weight of the paper (column 3, line 19). Thus, the resin can be added without a size press step. Examples of paper made containing the resin are given.

3. Claims 1-4, 8-10, 17, 18, and 21-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Cimecioglu et al (US 6,368,456). Cimecioglu discloses a method of making paper comprising aldehyde modified cellulose and a strength additive comprising a combination of an aldehyde functional polymer and an aldehyde reactive polymer. The aldehyde functional polymer can be an aldehyde starch derivative prepared by oxidation of the starch (column 4, lines 11-24), or a dialdehyde starch prepared by oxidation of the starch with periodic acid (column 4, line 32-34). The starches have minimal carboxylic acid content (column 4, lines 22-23). The aldehyde reactive polymer can be a polyvinylamine (column 3, lines 8-12). The resulting additive is added to the pulp at any time in the papermaking process, including the wet end. The additive is incorporated at 0.05 to 15% based on the dry weight of the pulp.

4. Claims 1-4, 8, 19, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Neissner et al (US 6,235,835). Neissner discloses polymer-modified anionic starch, whereby an anionically modified starch is reacted with a cationic polymer. The anionic starch can be an oxidized starch, such as a dialdehyde starch (column 12, lines 20-33). The cationic polymer can be a polymer of N-vinylamine (see column 5). The weight ratio of starch to polymer is from 1:0.0005 to 1:2. In other words, the polymer is 0.05 to 200% by weight of the starch, which reads on the claimed ranges.

5. Claims 1-3, 8, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor (US 3,719,514). Taylor discloses a starch binder composition prepared by reacting an anionic starch containing carboxylic groups with a polyalkylenimine. The starch can be an aldehyde starch (which is an oxidized starch containing carbonyl groups). The imine polymer is added up to about 10% by weight relative to the starch, which reads on the claimed ranges.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dishburger et al (US 3,467,608). Dishburger discloses a cationic starch prepared by reacting a starch with a polyalkylenimine or polyalkylenepolyamine. The imine or amine polymer is added from about 0.5-10% by weight relative to the starch, which reads on the claimed ranges. The starch can be an oxidized starch. Dishburger does not expressly disclose that the oxidized starch contains a carbonyl such as an aldehyde group. However, at the time of the invention, it would have been obvious to one skilled in the art to use an aldehyde starch, because an aldehyde starch is an oxidized starch with functional groups that are reactive to amines.

7. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cimecioglu et al (US 6,368,456) in view of Billmers et al (US 4,839,449). In column 4, lines 20-23, Cimecioglu says that the resulting aldehyde derivatives may have up to 15 mole % of aldehyde groups per mole of anhydroglucose (starch) units. This translates to 2.33% by weight aldehyde relative to the weight of starch, based on a molecular weight of 28 for aldehyde (C=O) and 180 for a starch unit (C₆H₁₂O₆). Cimecioglu does not disclose this quantity in terms of microequivalents per gram of starch.

Billmers discloses a formula for converting titration data (titration of aldehyde-containing starch with NaOH) to grams of aldehyde per 100 grams of starch. The formula is given in column 10, line 60. At the time of the invention, it would have been obvious to one skilled in the art to use this formula for converting between microequivalents and grams of aldehyde per gram of starch. The titration volume (ml) times the normality of NaOH (milliequivalents per ml) defines the number of milliequivalents in the measured sample. To determine the microequivalents of aldehyde per gram of starch in Cimecioglu, one substitutes 2.33% aldehyde into the left side of the equation, divides by 2.9, and multiplies by 1000 to convert milliequivalents to microequivalents. This calculation yields 804 microequivalents per 100 grams of starch, or 8.04 microequivalents per gram of starch, which reads on the claims. (For comparison, in Billmers, Example VII, the starch has 0.77% aldehyde which computes to 2.66 microequivalents per gram of starch).

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cimecioglu et al (US 6,368,456). Cimecioglu discloses a method of making paper comprising aldehyde modified cellulose and a strength additive comprising a combination of an aldehyde functional polymer and an aldehyde reactive polymer (described above). The aldehyde functional polymer can be an aldehyde starch derivative prepared by oxidation of unmodified starch in a system with an oxidizing power of up 14.18 g of active chlorine per mole of starch unit (column 4, lines 11-24). A starch unit ($C_6H_{12}O_6$) is 180 g, therefore the amount of chlorine is up to 7.87% by weight of the starch, which reads on the claimed ranges of claims 15 and 16.

With respect to claim 14, from which claims 15 and 16 depend, Cimecioglu does not expressly disclose using hypochlorite to obtain the 14.18 g of active chlorine oxidizing power. However, at the time of the invention, it would have been obvious to one skilled in the art that hypochlorite is used because it provides a source active chlorine, and also because hypochlorite is used by Cimecioglu for oxidizing the cellulose, which has the same basic unit of structure as starch.

Claim Rejections - 35 USC § 102/103

9. Claim 25 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Espy (US 3,728,214). Espy discloses polyamine-acrylamide-polyaldehyde resins for use as strength agents in making paper (described above), made by reacting a polyamine containing primary and/or secondary amine groups with a polyacrylamide. The resulting resin is added to the wet end of the papermaking process at a dosage of 0.05% to 5% based on the dry weight of the paper (column 3, line 19). Examples of paper made containing the resin are given.

In the event any differences can be shown for the product of the product-by-process claim 25, as opposed to the product taught by Espy, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

10. Claim 25 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Cimecioglu et al (US 6,368,456). Cimecioglu discloses a

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method of making paper comprising aldehyde modified cellulose and a strength additive comprising a combination of an aldehyde functional polymer and an aldehyde reactive polymer (described above). The resulting additive is added to the pulp at any time in the papermaking process, including the wet end. The additive is incorporated at 0.05 to 15% based on the dry weight of the pulp. Examples of paper made containing the strength additive are given.

In the event any differences can be shown for the product of the product-by-process claim 25, as opposed to the product taught by Espy, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

Allowable Subject Matter

Claims 6 and 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose compositions comprising a carbonyl-containing starch and a polymer with a carbonyl-reactive functionality, whereby the starch has between 10 and 300 microequivalents carbonyl functional group per gram of starch, and has been oxidized with an oxidizing agent between 0.01 to 3.0% by weight of the starch. Prior art oxidized starches can vary widely in the number of carbonyl functionalities per unit of starch, and are accordingly made with widely varying amounts of oxidizing agent. Since the prior art does not expressly disclose the claimed degree of oxidation or aldehyde content of the starches used in the aforementioned references, it would be unobvious to choose from the large number of starches available to read on the present invention.

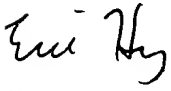
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


Slager (US 3,086,969) discloses periodate oxidation of starch to dialdehyde starch. The amount of periodate oxidizing agent is much greater than claimed. Slager is incorporated by Cimecioglu.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hug whose telephone number is 703 308-1980. The examiner can normally be reached on Monday through Friday, 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 703 308-1164. The fax phone numbers for the organization where this application or proceeding is assigned are 703 305-7718 for regular communications and 703 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0651.


jeh
July 24, 2002


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